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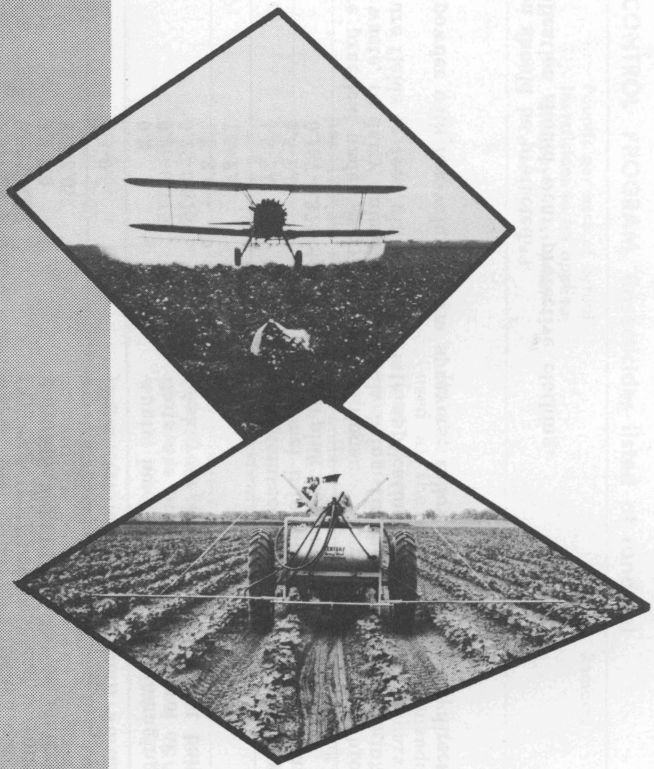
Texas Guide

for controlling

Cotton Insects



TEXAS A&M UNIVERSITY
TEXAS AGRICULTURAL EXTENSION SERVICE
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TEXAS GUIDE FOR CONTROLLING COTTON INSECTS

RECOMMENDATIONS IN THIS GUIDE are based on results of continuing research conducted throughout the State by the Texas Agricultural Experiment Station and the Entomology Research Division, U. S. Department of Agriculture. A committee composed of state and federal research personnel and Extension specialists meet annually to review research results and to make appropriate revisions in recommendations. Because of the constantly changing cotton insect situation, this conference is held to develop the safest and most profitable recommendations for producers in Texas.

The development of resistance to insecticides, deposit of harmful residues in the soil or on neighboring crops and destruction of beneficial insect parasites and predators dictate the judicious use of insecticides. If possible, their use should be restricted to actual need based on inspections.

At least 10 species of cotton insects and mites in Texas have shown some degree of resistance to chemicals that once were effective. There is good evidence that the more extensively a material is used, the more rapidly resistance develops.

Fruits, vegetables and animal feed have been contaminated by insecticidal drift, sometimes resulting in harmful residues. Continued excessive use of certain insecticides results in soil residues which makes growing of root crops in these soils hazardous.

Natural populations of parasites and predators play an important role in cotton insect control and should be maintained by avoiding the use of chemicals unless harmful numbers of injurious insects develop.

The use of chemicals is paramount to profitable cotton production in most areas, but a sound insect control program must be part of an integrated one, making maximum use of natural and cultural controls. Immediate results and long-range consequences call for careful consideration in developing profitable and effective insect control recommendations.

Cotton insects can be controlled economically by using recommended insecticides at the correct time. (See table.) Insecticides must cover the plant for effective control. Plants, however, usually are not protected when insects attack new growth or when chemicals are washed off.

For information on the identification, life history and nature of damage of major cotton insects, see B-933, **Cotton Insects.**

Substantial profits have been made even when many applications were necessary for maximum yields. On upland soils where insect infestations do not last long, fewer applications may be needed. The control program for 1965 includes three phases:

1. EARLY SEASON CONTROL (insures early fruiting and maturity in certain areas)
2. LATE SEASON CONTROL (insures continued fruiting and protects fruit)
3. EARLY STALK DESTRUCTION AND FARM CLEANUP (reduces overwintering populations of boll weevils, pink bollworms, bollworms and tobacco budworms)

The grower must carry out an adequate control program for greatest benefits. Inspect cotton before applying insecticides to determine the infestation degree and to check for pests, such as aphids and spider mites, which may influence choice of insecticides.

Extension of the early season control program after the one-third grown square stage may create conditions favorable for bollworm buildup. However, if fleahoppers are numerous, it may be necessary to initiate the late season control program.

Apply late season treatments when infestation counts indicate the need. Cotton grown under irrigation or on high-yielding land usually requires protection longer than the dryland acreage.

Early Stalk Destruction and Farm Cleanup

Early harvest, immediate stalk destruction and plowing under debris before the first frost reduces boll weevil, pink bollworm, bollworm and tobacco budworm populations. These practices force the boll weevil into starvation before time to enter winter quarters, prevent late-season buildup of weevils, pink bollworms, bollworms and tobacco budworms and reduce the number that survive the winter. The addition of 0.5 lb. methyl parathion or 0.25 lb. Guthion to arsenic acid or phosphate-type defoliants has proved beneficial in reducing potential overwintering boll weevil populations. **Do not add methyl parathion or guthion to chlorate defoliants and/or dessicants.** See L-219, **Ways to Fight the Pink Bollworm in Texas.**

Beneficial Insects

Natural populations of beneficial insects help control cotton pests, such as the bollworm, cotton aphid and spider mite. However, never rely entirely on beneficial insects for control, but examine the fields frequently to determine insecticide need. The introduction or release of neither trichograma wasps nor convergent lady beetles has proved effective in controlling damaging bollworm populations.

Pink Bollworm

Begin pink bollworm counts after cotton has been blooming for at least 5 days. Select five representative locations in the field, step off 300 feet of row and count the number of rosetted blooms. Add the total number of rosetted blooms from these five locations and multiply by 10 to obtain the number of worms per acre. When approximately 350 or more worms per acre are found, begin treatment immediately.

When less than 350 worms per acre are found, make boll inspections as soon as the first bolls are 4 weeks old. Continue inspections weekly. Walk diagonally across the field and collect at least 100 bolls (two-thirds grown or larger). Crack the bolls and examine the inside of the hull for tunnels made by small worms. Start treatment when 10 to 15 percent of the bolls are infested. Continue treatment until 70 percent are open.

INSECTICIDES SHOULD BE APPLIED AT INTERVALS OF NOT MORE THAN 5 DAYS FOR EFFECTIVE CONTROL OF THE BOLL WEEVIL, BOLLWORM AND PINK BOLLWORM.

General Information

In the late season program, dusts and sprays are equally effective when properly applied. Maintain a strict 5-day schedule, even if showers occur. Repeat the application as soon as possible if the insecticide is washed off within 24 hours, except when aphicides are used. Increase dosages to the maximum, when infestations are heavy, and apply insecticides at 5-day intervals or less.

For detailed information on the use of sprays and spray machinery, see L-486, **Insecticidal Spraying of Field Crops With Ground Machinery.**

Apply dusts when the air is calm. Dew on plants is not necessary. Dusts and wettable powders are washed off more easily by light showers than sprays. Place dust nozzles on ground machines 4 to 6 inches above the plants.

Ground machines and airplanes are equally effective for insecticide application. For best results with airplanes, flag the swaths so that they overlap. Increase dosages recommended in this guide by at least 50 percent when making early season aerial applications. Apply aerial spray at 2 to 2½ gallons per acre except in West Texas and the lower Rio Grande Valley where 3 or 4 gallons per acre are needed.

Some insecticides are destructive to honeybees. Prevent their destruction if at all possible, since bees help pollinate many agricultural crops.

For additional information, contact your county agent or write the Extension entomologist, College Station, Texas.

Insecticidal Mixtures

Commercial mixtures of emulsifiable concentrates containing several insecticides are being marketed in the State. Know the content of these mixtures and make sure recommended dosages of the insecticides required for pest control are applied.

Caution

All insecticides are poisonious. Follow carefully all precautions on the label. Take special precautions when handling parathion, endrin, methyl parathion, demeton, Di-Syston, Guthion, Bidrin and phorate (Thimet). Avoid skin contact. Do not breathe the vapors or drift from sprays or dusts.

Prevent drift from contaminating neighboring crops.

CONVERSION TABLE

Pounds of Actual Insecticide in Different Quantities of Spray Concentrate*

Insecticide	Gal.	2 Qt.	1 Qt.	1 Pt.
Aldrin	2.0	1.0	0.5	0.25
Bidrin	8.0	4.0	2.0	1.00
DDT	2.0	1.0	0.5	0.25
DDT	3.0	1.5	0.75	0.375
Demeton	2.0	1.0	0.5	0.25
Dieldrin	1.5	0.75	0.375	0.187
Endrin	1.6	0.8	0.4	0.2
Ethion	4.0	2.0	1.0	0.5
Guthion	2.0	1.0	0.5	0.25
Heptachlor	2.0	1.0	0.5	0.25
Malathion	5.0	2.5	1.25	0.675
Methyl parathion	2.0	1.0	0.5	0.25
Methyl parathion	4.0	2.0	1.0	0.5
Methyl Trithion	4.0	2.0	1.0	0.5
Parathion	2.0	1.0	0.5	0.25
TDE	2.0	1.0	0.5	0.25
Toxaphene	6.0	3.0	1.5	0.75
Carbophenothion (Trithion)	4.0	2.0	1.0	0.5
BHC-DDT	2.4	1.2	0.6	0.3
Strobane-DDT	6.0	3.0	1.5	0.75
Toxaphene-DDT	6.0	3.0	1.5	0.75
		Pounds Actual Carbaryl (Sevin)		
	3.0	2.0	1.0	0.5
	—	—	—	—
Pounds of Carbaryl (Sevin) 80% wettable powder required	3.75	2.5	1.25	0.625

*Certain formulations may differ in the amount of actual insecticide per gallon. Refer to the manufacturer's label for specific concentration, and adjust spray mixtures accordingly.

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EARLY SEASON CONTROL PROGRAM (Insecticides listed at random)

Insects	Insecticides	Pounds per acre of actual insecticides to be applied as spray unless otherwise indicated[1]	Remarks
Application at planting time for control of: Thrips, Aphids, Spider mites, Leaf miners	A. Di-Syston (Granules-in-furrow)	0.5-1.0	Provide control for 4 to 6 weeks following planting. When used at the maximum recommended rates under conditions of cool, wet weather, phorate or Di-Syston may cause emergence delay or stunting and result in stand reduction. Injury may be more pronounced on light sandy soils. Exercise care in using systemic insecticides with pre-emergence herbicides.
	B. Phorate (Granules-in-furrow)	0.5-1.0	
	C. Phorate (Pre-treated seed)	1.0-1.5 lb. per 100 lb. seed	
Cutworms	A. Toxaphene-DDT (2-1 mixture)[2]	2.0-3.0	Examine seedling cotton for presence of these pests. Apply treatment as needed.
	B. Endrin[2,9]	0.3-0.4	
	C. Strobane-DDT (2-1 mixture)[2]	2.0-3.0	
Darkling beetles	A. Heptachlor[2,4]	0.5	Brown to black beetles which feed around the base of seedlings. Damage resembles cutworm attack. Begin control when damage warrants it.
	B. Dieldrin[2]	0.375	
Thrips	A. Dieldrin + DDT[2]	0.2-0.25 + 0.5	Inspect fields and if thrips are present, apply soon after plant emergence. The first application may not be needed until the four-leaf stage or until thrips appear. Make a second application 7 days later if infestation persists. In South and West Texas, begin control as soon as damage is apparent on seedling plants. Damage is characterized by wilted, deformed and blackened leaves. Silvering of the lower leaf surface also is common. If difficulty is encountered in thrips control, substitute methyl parathion at 0.25 lb. per acre for DDT.
	B. Guthion[3]	0.125-0.25	
	C. Strobane-DDT (2-1 mixture)[2]	1.25-2.25	
	D. Carbaryl (Sevin)[5]	0.5-1.0	
	E. Toxaphene-DDT (2-1 mixture)[2]	1.25-2.25	
	F. Heptachlor + DDT[2,4]	0.25-0.375 + 0.5	
	G. Endrin + DDT[2,9]	0.2-0.3 + 0.5	
	H. Bidrin[2,8]	0.1-0.25	
Overwintered boll weevils	A. Carbaryl (Sevin)[5]	1.25-1.5	Where weevils are found, apply just before first squares are one-third grown to prevent egg laying. If more weevils emerge from hibernation sites, an additional treatment may be necessary. These insecticides also control thrips and cotton fleahoppers. Guthion, carbaryl (Sevin), Methyl Trithion and methyl parathion produce rapid, effective control of overwintered boll weevils in areas where they are resistant to chlorinated hydrocarbons.
	B. Guthion[3]	0.25	
	C. Methyl parathion[6,10]	0.25-0.375	
	D. Methyl Trithion[2,4]	0.375-0.5	
	E. Toxaphene-DDT (2-1 mixture)[2]	2.0-3.0	
	F. Strobane-DDT (2-1 mixture)[2]	2.0-3.0	
	G. Endrin + DDT[2,9]	0.3-0.4 + 0.5-1.0	
Fleahoppers	Apply one of the spray materials recommended for thrips control.		Begin treatments when 15 to 35 fleahoppers (nymphs and adults) are found per 100 terminals. As plants increase in size and fruit load, larger populations may be tolerated without serious damage. Base later treatments on fleahopper numbers and on damage as indicated by excessive loss of small squares. Apply sprays at 7-day intervals.
Cotton aphids	A. Malathion	0.625-0.9	In early season, apply insecticides as needed. In late season, begin treatment when honeydew appears. Demeton, parathion, malathion or methyl parathion may be combined with other sprays.
	B. Methyl parathion[6,10]	0.25-0.375	
	C. Parathion[6]	0.25-0.375	
	D. Demeton (Systox)[2,7]	0.125-0.25	

LATE SEASON CONTROL PROGRAM (Insecticides listed at random)

Insects	Insecticides	Amount per acre of actual insecticide to be applied as dust or spray	Remarks
	Apply dusts at 10-15 pounds per acre unless otherwise indicated		
Bollworms	A. Strobane-DDT (2-1 mixture)[2]	3.0-4.5	HOW TO CHECK FOR BOLLWORMS—Examine the terminal buds (upper 3 to 4 inches of the plant) of 100 cotton plants and 100 consecutive squares and bolls at each of several points in the field. Begin treatment when bollworm eggs and four to five young worms are found per 100 terminals or 5% of the small squares and bolls have been injured by small bollworms. Apply dusts or sprays at 5-day intervals or less. Check fields closely 2 to 3 days following each application to ensure effective control. Where control has not been obtained, repeat the application immediately using one of the recommended materials plus methyl parathion.
	B. Toxaphene-DDT (2-1 mixture)[2]	3.0-4.5	
	C. Carbaryl (Sevin)[5]	2.0-3.0	
	D. Endrin + DDT[2,9]	0.3-0.5 + 1.0-1.5	
	Where tobacco budworms and/or resistant bollworms are encountered, add 0.5 to 1.0 lb. of methyl parathion[6,10] to one of the above listed recommendations.		
	TDE[2] may be substituted for DDT in the above mixtures.		
Boll weevils	A. Carbaryl (Sevin)[5]	1.6-2.4	HOW TO CHECK FOR BOLL WEEVILS—Examine cotton weekly. Pull 100 squares, at least one-third grown, at random, taking a few squares at several representative places in the field. If 15 to 25% or more have weevil punctures, begin treatment. Apply insecticides at 5-day intervals. Under extremely heavy buildups, it may be necessary to shorten the interval to 3 days.
	B. Strobane-DDT (2-1 mixture)[2]	3.0-4.5	
	C. Methyl Trithion[2,13]	0.375-0.5	
	D. Methyl parathion[6,10]	0.375-0.5	
	E. Endrin + DDT[2,9]	0.3-0.4 + 0.5-1.0	
	F. Toxaphene-DDT (2-1 mixture)[2]	3.0-4.5	
	G. Guthion[3]	0.25	
	H. Calcium arsenate[2] (dust only)	10-15	
	Under conditions of heavy boll weevil infestations where it is desirable to reduce weevil numbers quickly, use Guthion or add Methyl Trithion or methyl parathion to toxaphene-DDT, Strobane-DDT or endrin-DDT.		
Cotton aphids	Use insecticides as recommended for early season control.		
Fleahoppers	Use insecticides as recommended for early season control.		
Spider mites	A. Carbophenothion (Trithion)[2]	0.375-0.75	Treat when leaves begin to turn yellow. Demeton, Ethion or Trithion generally are more effective for mite control. Two applications at 5-day intervals may be necessary with all materials except demeton. In certain locations, some species of mites are highly resistant to miticides and are difficult to control with available materials.
	B. Methyl parathion[6,10]	0.25-0.375	
	C. Ethion[2,12]	0.375-0.75	
	D. Parathion[6]	0.25	
	E. Demeton (Systox)[2,7]	0.25	
Lygus and stink bugs	A. Toxaphene-DDT (2-1 mixture)[2]	1.5-3.0	When seven to ten lygus bugs or two or more stink bugs per 100 sweeps with a 15 to 16-inch net are found, begin treatment. Apply dusts or sprays at 5 to 7-day intervals or as required.
	B. BHC-DDT (3-5 mixture)[2,11]	1.25	
	C. DDT[2]	1.0	
	D. Strobane-DDT (2-1 mixture)[2]	1.5-3.0	
Leafworms	A. Guthion[3]	0.25	Apply dusts or sprays when cotton leafworms first appear and at 5-day intervals until control is obtained. Young worms are easier to kill than old worms. The BROWN COTTON LEAFWORM can be controlled effectively with parathion—0.125-0.25 lb. or malathion—0.35 lb.
	B. Parathion[6]	0.125-0.25	
	C. Carbaryl (Sevin)[5]	1.0-1.25	
	D. Methyl parathion[6,10]	0.125-0.25	
	E. Toxaphene-DDT (2-1 mixture)[2]	1.5-3.0	
	F. Strobane-DDT (2-1 mixture)[2]	1.5-3.0	
Cabbage loopers	A. Endrin[2,9]	0.4-0.5	Begin treatment when small worms first appear.
Grasshoppers	A. Dieldrin[2]	0.2	Apply insecticides when damaging infestations appear. Baits are preferred for control of "jumbo" grasshoppers. (Ask your county agent about bait mixture.)
	B. Aldrin[2]	0.25-0.375	
	C. Heptachlor[2,4]	0.25-0.375	
	D. Toxaphene[2]	1.5-3.0	
	E. Carbaryl (Sevin)[5]	1.5-2.0	
Pink bollworms	A. Carbaryl (Sevin)[5]	1.5-2.0	Apply insecticides at 5-day intervals. See text for additional information and how to make infestation counts for pink bollworms.
	B. DDT[2]	1.5-2.0	
	C. Guthion + DDT[2,3]	0.187-0.375 + 1.5-1.0	

[1]Dusts are effective, but sprays are considered more practical under early season conditions.
[2]Do not graze or feed treated plants, including gin waste, to dairy animals or animals being finished for slaughter.
[3]Do not apply within 1 day of harvest. Do not pasture fields or feed gin waste if late applications are made.
[4]Do not apply after bolls open.
[5]Problems may be encountered in spraying wettable powder with low-volume farm sprayers; follow manufacturer's directions carefully.
[6]Do not apply within 5 days of hand picking.
[7]Do not apply within 21 days of harvest.
[8]Do not apply within 10 days of harvest.
[9]Workers entering fields within 5 days of application should be protected.
[10]Workers entering fields within 24 hours after application should wear protective clothing.
[11]Do not apply when rotating with root crops.
[12]Do not apply after 25% of bolls are open.
[13]Do not apply after half the bolls are open.